Attorney Docket No. ITW7510.037

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Bankstahl, Herbert A.
Serial No.	:	09/404,233
Filed	:	September 23, 1999
For	:	METHOD AND APPARATUS FOR CENTERING A GENERATOR STATOR AND ROTOR
Group Art No.	:	2834
Examiner	:	Lam, Thanh

Commissioner of Patents
and Trademarks
Washington, D.C. 20231

FAX RECEIVED
JAN 17 2003
TECHNOLOGY CENTER 2800

Declaration Under 37 CFR §1.131

I, Herbert A. Bankstahl, being duly sworn, aver:

1. That I am the inventor for the above identified patent application.

2. That I conceived and reduced to practice, in the United States, the invention claimed in the above-identified patent application prior to March 26, 1999, the earliest effective filing date of the cited reference, U.S. Patent No. 6,133,659 issued to Rao.

3. Attached as Exhibit A is a copy of a schematic evidencing the conception of this invention which is dated before March 26, 1999 (date redacted).

4. Attached as Exhibit B is a copy of a Field Test Report (customer identification redacted) evidencing the reduction to practice of this invention which is dated before March 26, 1999 (date redacted).

5. The specification of the present application describes the device tested in the Field Test Report of Exhibit B prior to March 26, 1999.

6. I have reviewed all pending claims (claims 32-54) of the pending application and aver that the subject matter of these claims was incorporated into the device tested as described in ¶¶ 4 and 5.

These statements have been set forth to the best of my memory and recollection and I acknowledge and recognize that willful, false statements and the like are punishable by fine or imprisonment, or both.

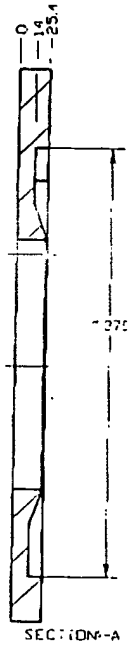
Dated: 1/17/03

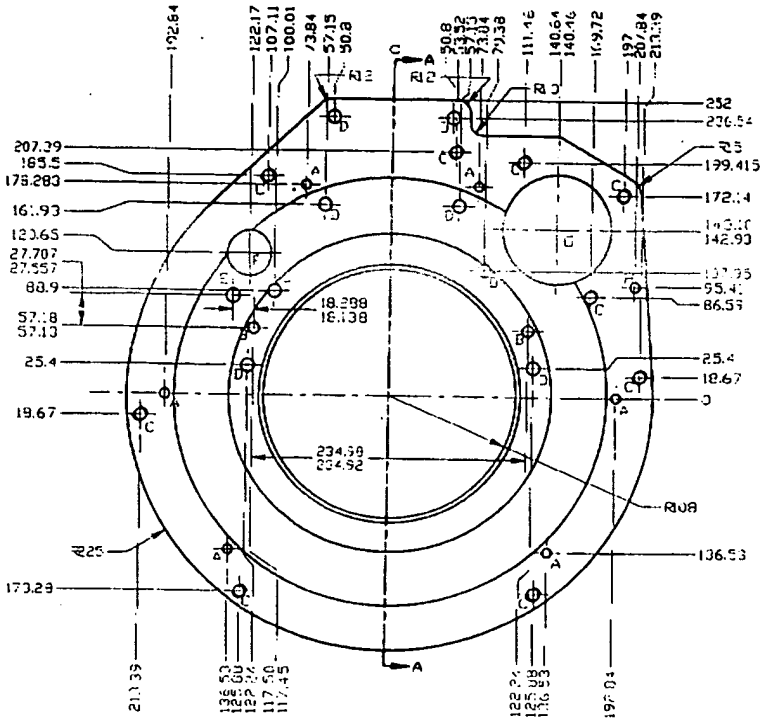
H. Bankstahl

Herbert A. Bankstahl

FAX RECEIVED
JAN 17 2003
TECHNOLOGY CENTER 2800







NOTE:
- ALL DIMENSIONS ARE IN MILLIMETERS

HOLE LEGEND
A -9.015 / -8.000 DIA.
B -9.637 / -9.501 DIA.
C -M10
D -11 DIA.
E -18.018 / 18.000 DIA.
F -38.1 DIA.
G -32.13 / -32.08 DIA.
H - 6.5 DIA.

REV	DATE	BY	ECO	REVISION DESCRIPTION

TOLERANCES UNLESS SPECIFIED:
DEC. ±.030
FRAC. ±
ANGLE. ±
FINISH

MILLER ELECTRIC MFG. CO.
APPLETON, WI. USA

TITLE:
BACKPLATE, ENGINE

DRAWING NOT TO SCALE | CONFIDENTIAL
INDEX - | REPLACES -
DRN. BY [redacted] | SIZE B | DWG. NO 190 068 | REV. .

[redacted]

Installation Appraisal Report

[redacted]

Customer : Miller Electric Machine Type : Big Blue 502 P Machine Serial Number : Prototype	Engine Type : 3.152.4 Engine List Number CM70463 Project Number	Report Number 1998-100IA Origination or Type of Report ✓
Engine Ratings Maximum Power 34 kW @ 1800 rpm Maximum Torque 184 Nm @ 1500 rpm	Engine Serial Number U994150C Curve Number TPL F 2302	Business Unit (specify) PIL Third Party Internal Strictly Confidential
Date of Appraisal [redacted] Date Issued	Carried Out By: [redacted] Approved By	
Reporting Area		Initial Installation Appraisal Report Number

This Report must not be issued outside VarityPerkins without authorisation from the Applications Manager

The contents of this Report are not necessarily the agreed view of VarityPerkins
They must not be reproduced, quoted or used to promote action in other Departments without the agreement of the Applications Manager

© Perkins Engines Group Limited
All rights reserved

Circulation

Abstract	Report Type: Appraisal
General Manager [redacted]	
Business Unit Sales Director (specify) [redacted]	•
Product Planning Director (specify)	•
Manufacturing Director (specify)	•
Customer (specify contact name) Ben Peotter	•
Other Person Authorised by Applications Engineering Manager (specify) Mike Rosser.	•
Full Report (Yellow Leader Sheet)	
Applications Engineering Manager	•
Business Unit Sales Account Manager (specify).....Steve Corley	•
Business Unit Originating Area	•
Technical Library (report master)	•
Chief Engineer - Inter Group Product	•
Product Service Manager (specify) Earl Helmer.	•
Other Person Authorised by Applications Engineer Manager(specify)	•

Application Installation Report - Index

Description	Page Number
Index Form	2
Legal Status	3
Installation 'Sign Off'	4
Summary of Recommendations	5
Index	
Cross Reference Form	6
Installation Appraisal Data Sheets	7
1.0 Application Description	7
2.0 Engine Mountings	7 – 9
3.0 Induction System	10
5.0 Electrical System	11
5.0 Fuel System	12
6.0 Lubricating Oil System	12 – 13
7.0 Exhaust System	13
8.0 Controls and Instrumentation	14
9.0 Belt Drives from Front End	14
10.0 Axial Drives from Front End	15
11.0 Gear Driven Auxiliaries	15
12.0 Backend Drive Arrangement	16
13.0 Cooling System	17
14.0 Cooling Tests	18
15.0 Application Cooling Tests	19
16.0 Serviceability / Major Assemblies	19 – 20
17.0 Approval	21
Report Comment Sheet	22
Appendices	
i Test Results Sheets	22
ii Cooling Test Data and Results	22
iii Test Bed Results	22
iv Application Specification Data Sheets	22
v Photographs	Attached

Legal Status

[redacted] Installation Approval

The following information is recorded as applicable at the date of visit and installation approval is only to be used as an opinion on the suitability of the engine for the application.

The manufacturer and customer are reminded that it is their responsibility to ensure compliance with the requirements of the Health & Safety at Work Act 1974 and any other applicable legislation, both nationally and internationally, in relation to the engine installation applicable to the equipment concerned.

In giving notice of approval in respect of the installation, [redacted] do not assume such responsibilities on behalf of the manufacturer or customer and while engine installation approval and advise is an opinion given in good faith, no liability can be accepted for any error therein and the manufacturer and customer must act and insure accordingly.

[redacted]

Engine Installation Sign-Off

Application Category: Industrial	
Customer: Miller Electric	
Address: 1635 West Spencer Street, Appleton, Wi. 54912-1113	
Engine Type: 3.152.4	Engine Number: U994150C
Engine Rating: 34 KW @ 1800 RPM	Parts List Number: CM35007
Machine Model and Type: Big Blue 502 P	
Machine Number: Prototype	Estimated Load Factor: 40 %

Engine Installation Appraisal

Carried Out By: [redacted]

Appraisal Report Reference

Operational Limits	
Ambient clearance temperature, coolant	55 °C (to 103 °C maximum)
Ambient clearance temperature, oil	64 °C (to 125 °C maximum)
Exhaust back pressure	4.25 kPa @ 1803 rpm
Inlet depression	1.28 kPa @ 1835 rpm
Known territories for which the machine is destined	World Wide Use

Engine Installation Approval

[redacted] engine installation approval and advice is an opinion offered in good faith, but [redacted] does not accept any liability whatsoever in relation thereto, for instance in respect of:

1) the customer's responsibility to ensure compliance with the requirements of the Health and Safety at Work etc, Act 1974

2) any defect in installation approval or advice given, and the customer must act and insure accordingly

- The engine installation is approved. Recommendations raised in the Initial Installation Appraisal Report have been implemented satisfactorily
- The engine installation cannot be approved until the points raised in the Summary of Recommendations (overleaf) have been addressed

Signed	Date	Report Number	Serial Number
[signature]	[redacted]	1998-100IA	U994150C

[redacted]

Engine Installation Sign-Off Summary of Recommendations

The engine installation cannot be approved until the following points have been rectified. *(The Applications Engineer must specify when the recommendation is advisory, all other recommendations must be implemented before the installation can be approved)*

Miller Electric is introducing two 400-amp welders, the first being powered by the 3.152.4, the second to be powered by the 900 series. This report contains information on the 3.152.4, although the idea from the onset was to use many of the same components for both engines. Miller Electric will continue to build a non-emission compliant welder for export into countries not requiring EPA certification, the 900 will be built for those requiring certification.

The machine tested was a 400 Amp, 40 Volt welder. The duty cycle used for the test consisted of the following:

- Ψ 400 Amps, 40 Volts, 100 % duty cycle. At this rating the machine can operate indefinitely. The Kva for this rating is 16.
- Ψ 600 Amps, 25.5 Volts, 30 % duty cycle. This rating permits 3 minutes out of 10 operation, the remaining 7 minutes allows the machine to cool. The Kva for this rating is 15.3.
- Ψ 500 Amps, 40 Volts, 60 % duty cycle. This rating is actually the most severe, it consists of 6 minutes on load, then 4 minutes off. The Kva for this rating is 20.

The measured ambient clearance for the engine coolant is 55 C, based on a maximum coolant temperature of 103 C. The lubricating oil ambient clearance was measured at 64 C, based on a maximum of 125 C.

The exhaust system utilises a one-piece muffler/manifold that was built by Nelson. A similar unit will be constructed for the 900 series incorporating the 3 individual ports. This is in development by Nelson and should be available soon. A prototype will be sent to Peterborough for thorough testing to ensure compliance with EPA requirements. The exhaust backpressure for the 3.152.4 measured at 4.25 Kpa.

The air inlet depression was measured at 1.28 Kpa. The air cleaner size was intentionally oversized to meet the stringent depression requirements of the 900 series. This is one component that will obviously be used on both machines. Actual depression measurements were just within acceptable limits outlined for the 900 series.

Exhaust temperatures were in the 500 C to 595 C range indicating adequate, but not excessive engine loading.

Additionally, I saw no excessive vibration problems with anything on either the engine or welder.

The only concern at this point comes from the open breather arrangement. The current configuration has the breather venting in front of the engine/behind the radiator. This combination, along with a pusher fan quickly clogs the radiator. When the machine is placed in a dirty environment the problem will happen much faster, leading potentially to overheating, and possible component failure from oil ingress/contamination. Miller Electric will try placing the breather outlet in front of the radiator.

Overall, I believe that this is an acceptable installation with a minor problem to resolve with the open breather system.

[redacted]	**Application Installation Cross Reference Form**	
Document Reference	Compiled By [redacted]	Date [redacted]

Data Sources
(Jobs, Tests, Computer Runs, Personnel)

Associated Internal References
(Memorandums, Reports)

Bibliography
(Books, Technical Papers)

Application Engineering
Installation Appraisal Data Sheet

Application Description / Sketch, etc

1.1	*Application*	
	• *Duties*	Welding
	• *Territory*	World Wide Use
	• *Ambient Temperature Range*	To 55 C
	• *Altitude Range*	To 3000 Metres
	• *Emissions Requirement*	None Required
1.2	*Weights*	
	• *Gross Vehicle Weight*	1815 Pounds
	• *Normal Unladen Weight*	1815 Pounds
1.3	*Engine Location Relative to Normal Travel Direction*	Axial, if placed on a trailer.
1.4	*Additional Information*	

Engine Mountings

2.1

	Manufacturer	Type	Hardness
Front	Bond – Flex Rubber Co # 083476A	Neoprene Rubber	60 Durometer
Rear	Bond – Flex Rubber Co # 083476A	Neoprene Rubber	60 Durometer

2.2 *Vibration Levels (subjective through speed range)*
Have vibration levels been appraised in an Initial Installation Appraisal Report? *Yes* ☐ *No* ☒

If no:

Operator Associated Items	*Acceptable*
Cabin Seat Control	*Acceptable*
Cabin Mounting/Isolation	*Acceptable*
Engine Mounted Items	*Acceptable*

Engine Mountings (Cont/d)

2.2 *Vibration Levels (subjective through speed range)*
Have vibration levels been appraised in an Initial Installation Appraisal Report? *Yes* ☐ *No* ☐

If no:

Engine Front	*Acceptable*
Engine Rear	*Acceptable*
Fuel Filter	*Acceptable*
Oil Filter	*Acceptable*
Alternator	*Acceptable*
Fuel Pipes	*Acceptable*
Oil Pipes	*Acceptable*
Starter Motor	*Acceptable*
Frame Mounted Items	*Acceptable*
Pre-Filter	*Acceptable*
Radiator	*Acceptable*
Coolers	*Acceptable*
Oil Filler	*Acceptable*
Water Pipes	*Acceptable*
Others (please specify)	*Acceptable*
Customer Supplied Components (Pumps, Compressors, Brackets, Linkage, etc)	*Acceptable*

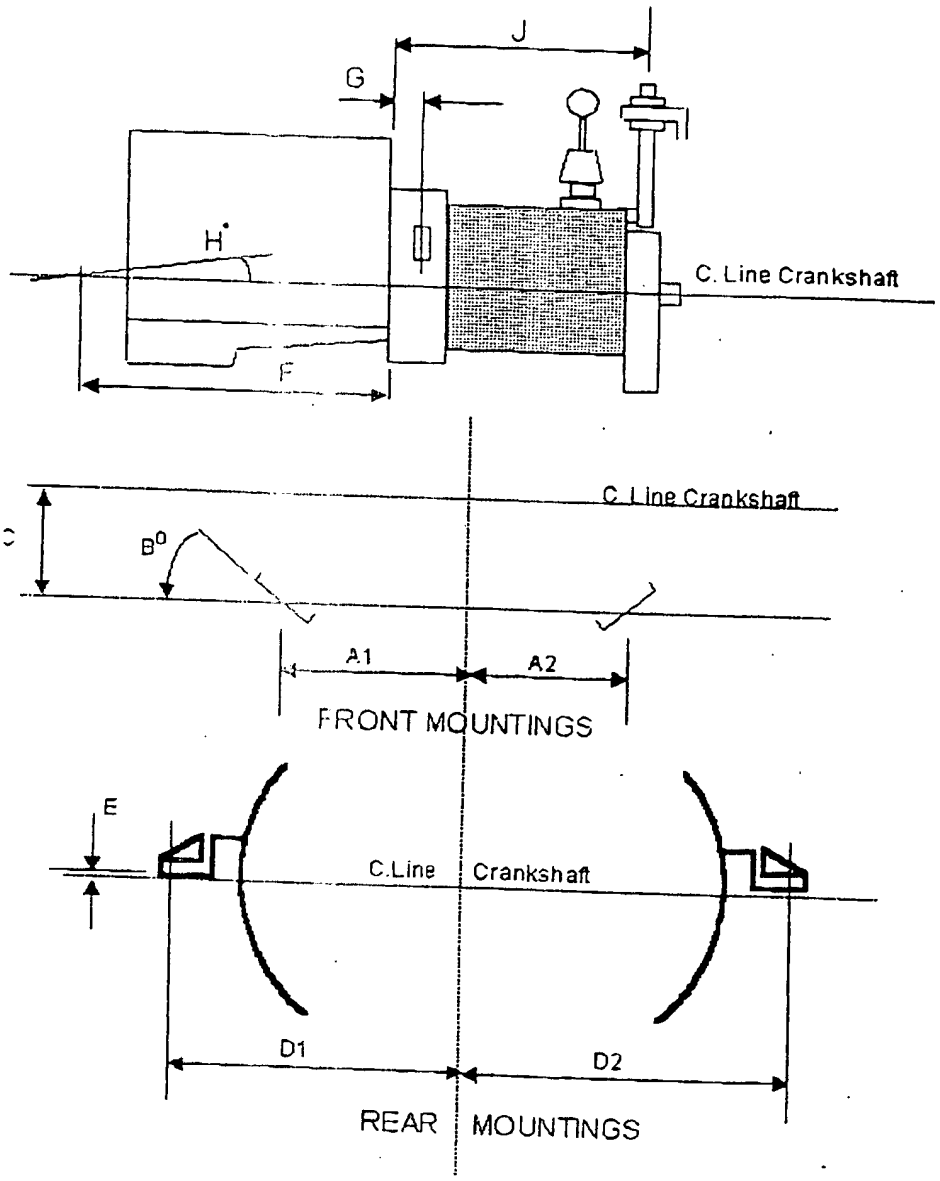
2.3 *Comments*

I noticed no unusual/excessive vibration patterns either at rated speed (1800 rpm), or at low idle operation.

2.4 *Recommendations*

No recommendations required to modify vibration isolation

Engine Mountings (Cont/d)



Dimension	Inches	mm	Dimension	Inches	mm	Dimension	Inches	mm
A1		250	D1		235	G	28.5	
A2		250	D2		235	H°	0	
B°	0		E		250	J	N/A	
C		51	F		343.			

Induction System

3.1	*Air Cleaner* • *Make* • *Type* • *Duty*	Donaldson # G065432 Canister Type Medium
3.2	*Airflow Capacity at 203 mm (8.0") H_2O*	4.89 Cubic Metres per minute
3.3	*Engine Rated Air Requirement*	1.9 Cubic Metres Per Minute
3.4	*Raincap or Pre-Cleaner Type*	None
3.5	*Air Cleaner Position*	Inside Cabinet
3.6	*Air Intake Position*	Bottom Of Canister
3.7	*Is Vacuator Valve Fitted*	*Yes*
3.8	*Restriction Indicator* • *Setting* • *Location of Indicator* • *Tapping Position*	None, but optional equipment Need setting 20 in H_2O
3.9	*Quality of Connections*	*Acceptable*
3.10	*Inlet Hose Specification*	Neoprene (65 – 75 Durometer)
3.11	*Induction Restriction at Engine Maximum Governed Speed* • *At Air Cleaner Outlet* • *At Turbo Inlet*	1.3 Kpa
3.12	*Comments*	The air cleaner assembly has been intentionally up-sized to accommodate the 900 series stringent depression requirements
3.13	*Recommendations*	*No modifications on the induction are required at this time.*

Electrical System

4.1 *Starter Motor Supplied fitted to engine?* — *Yes*
If no,
- *Make*
- *Position*
- *Earth*

4.2 *Starter Motor / Solenoid Circuit Cable Sizes*
- *Length 788 mm*
- *Cross Section 16 AWG*

4.3 *Heat/Start Switch Type* — Toggle-Rotary

4.4 *Alternator Supplied fitted to engine* — *Yes*

If no:
- *Make*
- *Type*
- *Current Rating*
- *Regulator Type:* — *Integral*

4.5 *Battery*
- *Make* — East-Penn, Part Number 624 MFD
- *Type* — 12 Volt Wet Cell
- *Cold Cranking Amps* — 650 Amps
- *Reserve Capacity* — 110 Minutes

4.6 *Battery Cable Sizes*

	Length	*Cross Section*
Battery - Starter	1.143 Metre	1 AWG
Battery - Earth	0.66 Metre	2 AWG
Starter - Earth	0.406 Metre	2 AWG

4.7 *Estimated Minimum Start Temperature*
- *Unaided* — 0 C
- *Aided* — - 15 C

4.8 *Port Immersion Heater Fitted?* — *No*

If yes:
- *Make*
- *Type*

4.9 *Total Electrical Load* — Estimated at < 10 Amps

4.10 *Comments* — The electrical system on this machine requires minimal output

4.11 *Recommendations* — No modifications to the system are required

Fuel System

5.1	*Water Trap/Sedimenter*	
	• *Type*	Perkins Part # 2656086
	• *Position*	*Left Side Of Engine*
	• *Visibility*	*Acceptable*
5.2	*Primary Fuel Filter Fitted*	*Yes*
	If yes:	
	• *Make*	Donaldson Part # P550587
	• *Type*	Filter/Water Separator
5.3	*Gauze on Fuel Inlet Pipe*	*No*
5.4	*Thermostart Fitted*	*Yes*
5.5	*Ether Start Fitted*	*No*
	• *Type*	
5.6	*Position of Fuel Tank Base Relative to Lift Pump*	0.8 Metre below
5.7	*Fuel Tank Capacity*	94.6 Litre
5.8	*Low Pressure Fuel Pipes Satisfactory*	*Yes*
	• Material Specification	*Yes*
	• End Fittings	*Yes*
	• Inside Diameter Feed	*Yes*
	• Inside Diameter Return	*Yes*
	• Pipe Protection	*Yes*
5.9	*Comments*	Fuel system is basic Perkins with Donaldson Primary filter installed.
5.10	*Recommendations* No modifications required.	No modifications required.

Lub Oil System

6.1	*Oil Filter Supplied on Engine*	*Yes*
	If no:	
	• *Make*	
	• *Type*	
6.2	*Sump Gradeability*	30 Degrees
6.3	*Application Designed Maximum Gradient*	30 Degrees

Lub Oil System (Cont/d)

6.4	*Breather Type*	*Open*
	If Open, Subjective Quality of Oil Mist	*Unacceptable to customer*
6.5	*Comments:*	Miller will now install the breather tube outlet in front of the radiator.
6.6	*Recommendations*	Need to work with Customer to resolve open breather issue and to address 900 series when it's available.

Exhaust System

7.1	*Minimum Exhaust Pipe Diameter*	45 Millimetre
7.2	***Silencer***	
	• *Make*	Special Nelson muffler/manifold
	• *Type*	Muffler/manifold
	• *Length*	381 mm
	• *Diameter*	89 mm
	• *Location*	Left Side Of Machine
	• *Supports*	None
7.3	*Tail Pipe Exit Position*	Top Of Machine 1.4 Metres from ground
7.4	*Flap or Drain Fitted if Outlet Vertical*	*Flap: No – Pipe is mitred* *Drain: No*
7.5	*Exhaust Back Pressure (Measured at Full Power Rated Speed)*	1.28 Kpa @ 1803 RPM Full Load
7.6	*Free Acceleration Smoke on Installation*	N/A
7.7	*Exhaust Brake*	N/A
	• *Make*	
	• *Type*	
	• *Back Pressure at Flight Speed*	
	• *Is fuel shut off device fitted*	
7.8	*Comments*	Nelson has designed a manifold/muffler for both the 3.152.4 and the 900 series. This was done to conserve space.
7.9	*Recommendations*	Ensure the 900 series team has a manifold to test when it's available to confirm emission requirements.

Controls and Instrumentation

8.1	*Throttle Control - Maximum Speed Stop*	*Fitted*
8.2	*Stop Control* *Accessibility to Operator*	*Electric* *Acceptable*
8.3	*Tachometer Fitted*	*No*
8.4	*Hourmeter Fitted* • *Type* • *Reading*	Yes, Datco 42 Hours
8.5	*Oil Pressure*	*Light*
8.6	*Coolant Temperature*	*Light*
8.7	*Ammeter Fitted*	*No*
8.8	*Visibility of Gauges/Warning Lights* • *Day* • *Night*	*Acceptable* *Acceptable*
8.9	*Automatic Shut Down Device Fitted?* • *Make and Type*	*Yes* *Murphy Switch Gage. Unit shuts down for low oil pressure, high water temperature, or low fuel quantity.*
8.10	*Comments*	The welder has several shutdown devices; the first for high water temp (105 C); second for low oil pressure (20 Psi); the third for low fuel (10 US Gallons).
8.11	*Recommendations*	The system as tested does not require modification.

Belt Drives From Front of Engine

9.1	*Crankshaft Pulley and TV Damper* • *Type*	Single Groove, Part Number 31143733
9.2	*Details of Belt/s* *Crankshaft/Water Pump/Alternator*	Crankshaft – Water Pump – Alternator
9.3	*Additional Belt Drives* • *Type of Belt* • *From* • *To*	N/A
9.4	*Is Scheme Approved by Perkins?*	*Yes*
9.5	*Comments*	The belt drive arrangement is standard Perkins.
9.6	*Recommendations*	Arrangement requires no modification.

Axial Drive from Front of Crankshaft

10.1	*Type of Driven Auxiliary*	N/A
10.2	*Power Absorbed*	N/A
10.3	*Type of Drive*	N/A
10.4	*Is Lay-Out Approved*	N/A
10.5	*Comments*	Not applicable for this installation
10.6	*Recommendations*	Not applicable for this installation

Gear Driven Auxiliaries - Timing Case

	11.1 (a)	11.2 (b)	11.3 (c)
Position			
Unit			
Make			
Type			
Usage			
Ratio to Engine Speed			
Pressure Setting			
Volume Flow			
Power Requirement			
Is Scheme Approved by Perkins?	Yes / No	Yes / No	Yes / No

11.4 *Comments* Not applicable for this installation

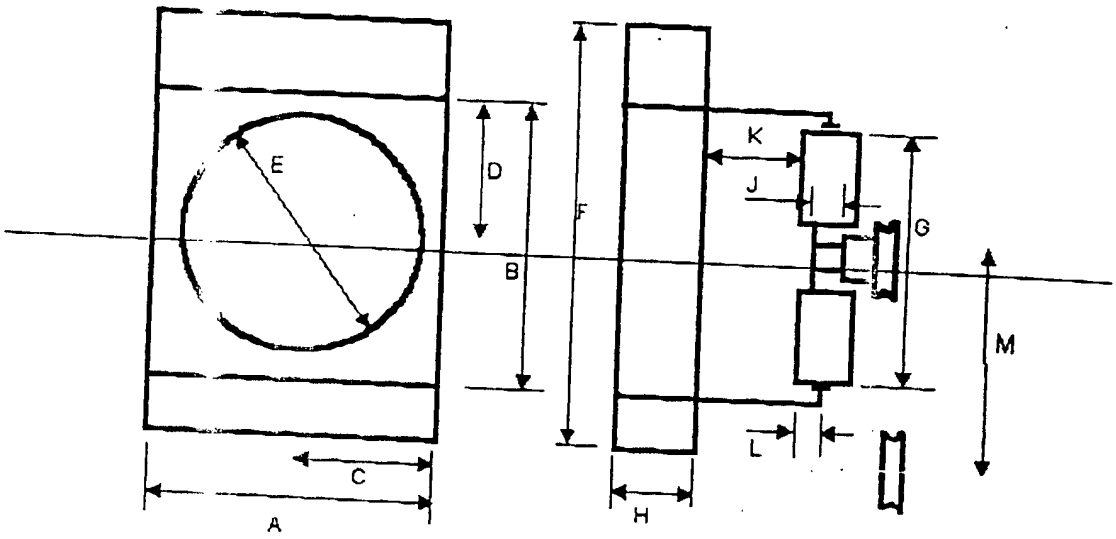
11.5 *Recommendations* Not applicable for this installation

Backend / Drive Arrangement

12.1	*Clutch Details*	N/A
12.2	*Torque Converter Details*	N/A
12.3	*Gearbox Details* • *Make* • *Type*	N/A
12.4	*Transmission PTO Positions*	N/A
12.5	• *Usage* • *Power Requirement*	N/A
12.6	*Rear Face Block Bending Movement* • *Design Limit Calculated*	N/A
12.7	*Generating Sets Only* • *Alternator Make* • *Alternator Model* • *Voltage* • *Frequency* • *Power Factor* • *Current* • *TV Analysis*	 Miller Design Miller Design 90 VDC – 380 VAC Aux Power 60 Hz. .85 400 Amps DC at 40 Volts @ 100 % Duty Cycle TV Analysis raised with PTECH for both machines
12.8	*Comments*	Miller Electric designed the Alternator. The same alternator will be used for both the 3.152.4 and the 903.27. TV analysis will be for both machines since the same alternator is used
12.9	*Recommendations*	No modifications are required.

Cooling System

This diagram must be completed unless an Engineering drawing is supplied from the customer
(Show radiator inlet and outlet connections - position and diameter)



A	504.8 mm	D	225 mm	G	381 mm	K	60.3 mm
B	438 mm	E	431 mm	H	50 mm	L	25 mm
C	238 mm	F	558 mm	J	39 mm	M	257.1 mm

13.1 *Fan*

• *Make*	Perkins Part Number 2485C706
• *Type*	Axial Flow
• *Fan Crankshaft Ratio*	1.51:1
• *Fan Blade Material*	Steel
• *Puller/Pusher*	Pusher
• *Number of Blades*	6

13.2 *Radiator*

• *Make / Part Number*	Modine, Part Number PR31800D
• *Type / Material*	Copper/Steel
• *Construction*	Fin/Tube
• *Mounting*	Rubber Mounted
• *Fins/Inch*	10
• *Pressure Cap*	7 Psi.
• *Number of Tubes*	90 x 3 Row

Cooling System (Cont/d)

13.3 *Air Charge Cooler* — N/A
- *Make / Part Number*
- *Construction*
- *Material*
- *Mounting*
- *Fins/inch*
- *Core Area*

13.4 *Lips on all Coolant Pipes?* — *Yes*

13.5 *Chaf Screen Area Type* — N/A

13.6 *Sketch Position of Cooling, Charge Cooler, Header Tank and Remote Oil Cooler Systems* — N/A

13.7 *Type of Coolant System Posivent Remote Header Tank etc, Provide Sketch and Pipe Sizes* — Basic System With Recovery Bottle

13.8 *Ancillary Cooling*

	Compressor / Cab Heater	Air Conditioner
Make		
Type		
Feed From		
Return To		

13.9 *Position of Connections for Ancillary Cooling*

13.10 *Comments* — The cooling system provides adequate cooling of the engine assembly.

13.11 *Recommendations* — No modifications required for the cooling system.

Cooling Tests

14.1 *Total System Capacity* — 9.8 Litre

14.2 *Fill Rate* — *Acceptable 10 Litre Per Minute*

14.3 *Aeration* / *Draw Down* — None seen

14.4 *Hot Shut Down* — Small amount of fluid seen on first shutdown, none on second.

14.5 *Comments* — The cooling test indicates adequate cooling and filling rates for the system that will be used on both the 3.152.4 and the 903.27.

14.6 *Recommendations* — No modifications required to the cooling system.

Application Cooling Tests

15.1	Test Procedure	Automated		
15.2	Weather Conditions	Test Cell		
15.3	Ground Conditions	Concrete		
15.4	Total Weight as Tested	1815 Pounds		
15.5	Thermostat/s Fixed Open	Yes		
15.6	Engine Covers Fitted	Yes		
15.7	Coolant Water/Antifreeze	50/50 Water/Anti		
15.8	Cab Heater Off	N/A		

15.9 Appraisal Kit Reference Used to Tests

15.10 Is all Test Equipment within Calibration — Yes

15.11 Comments — Welder tested in test cell facility utilising automated cycle. Test consisted of worst case conditions with ambient air temperatures near 40 C.
No modifications needed.

15.12 Recommendations

Serviceability

Has serviceability been appraised in an Initial Installation Appraisal Report? Yes ☐ No ☒

If no:

16.1 Dipstick — Acceptable

16.2 Oil Filter — Acceptable

16.3 Oil Filler — Acceptable

16.4 Sump Drain — Acceptable

16.5 Radiator Filler — Acceptable
Drain — Acceptable

16.6 Cylinder Block Drain — Acceptable

16.7 Battery — Acceptable

16.8 Water Trap/Sedimenter — Acceptable

16.9 Fuel Filters — Acceptable

Serviceability (Cont/d)

16.10	*Air Cleaner*	*Acceptable*
16.11	*Fan Belt Adjustment*	*Acceptable*
16.12	*Lift Pump Hand Primer*	*Acceptable*
16.13	*Excess Fuel Control*	*Acceptable*
16.14	*Tappets*	*Acceptable*
16.15	*Injectors*	*Acceptable*
16.16	*Removal of Cylinder Head*	*Acceptable*
16.17	*Lub Oil Sump*	*Acceptable*
16.18	*Fuel Pump*	*Acceptable*
16.19	*Lift Pump*	*Questionable*
16.20	*Water Pump*	*Acceptable*
16.21	*Exhaust Manifold*	*Acceptable*
16.22	*Induction Manifold*	*Acceptable*
16.23	*Engine*	*Acceptable*
16.24	*Comments*	All service is from the left side. The hand pump is not accessible from that side, therefore the machine is set-up with a low fuel shutdown system. Removing the right side panel provides access to the hand pump if required. With the low fuel shutdown system I believe there should be little use for the hand pump. Therefore; I believe that the system needs no modification.
16.25	*Recommendations*	

[redacted]

Application Installation Report Comment Sheet

Applications Manager

This appears to be a well-engineered installation of the 3.152.4 which bodes well for the future installation of the 900 series. Several thousand hours of durability testing have been satisfactorily completed by Miller

Name	Business Unit	Date
B. Chadwick	P.I.L	[redacted]

Technology Chief Engineer *(if required)*

Job Number	Report Number	Job Project Manager	Date
	1998/100IA		[redacted]

Perkins	Cooling Test	Date [redacted]

Machine Under Test: Big Blue 502 P | Machine Reference

Engine Type / Number / Rating: 3.152.4/34KW @ 1800 RPM

Test: Variable Cycle

Test Condition: Test Cell

Test Ground Details: Test Cell

Test Load / Cycle: Variable load testing worst load factor

Weather: N/A | Ground Control: N/A | Barometer: N/A

Fuel Pump Type / Setting Code: N/A

Installed Idle / Maximum Run Out Speed: 1350 rev/min 1830 rev/min

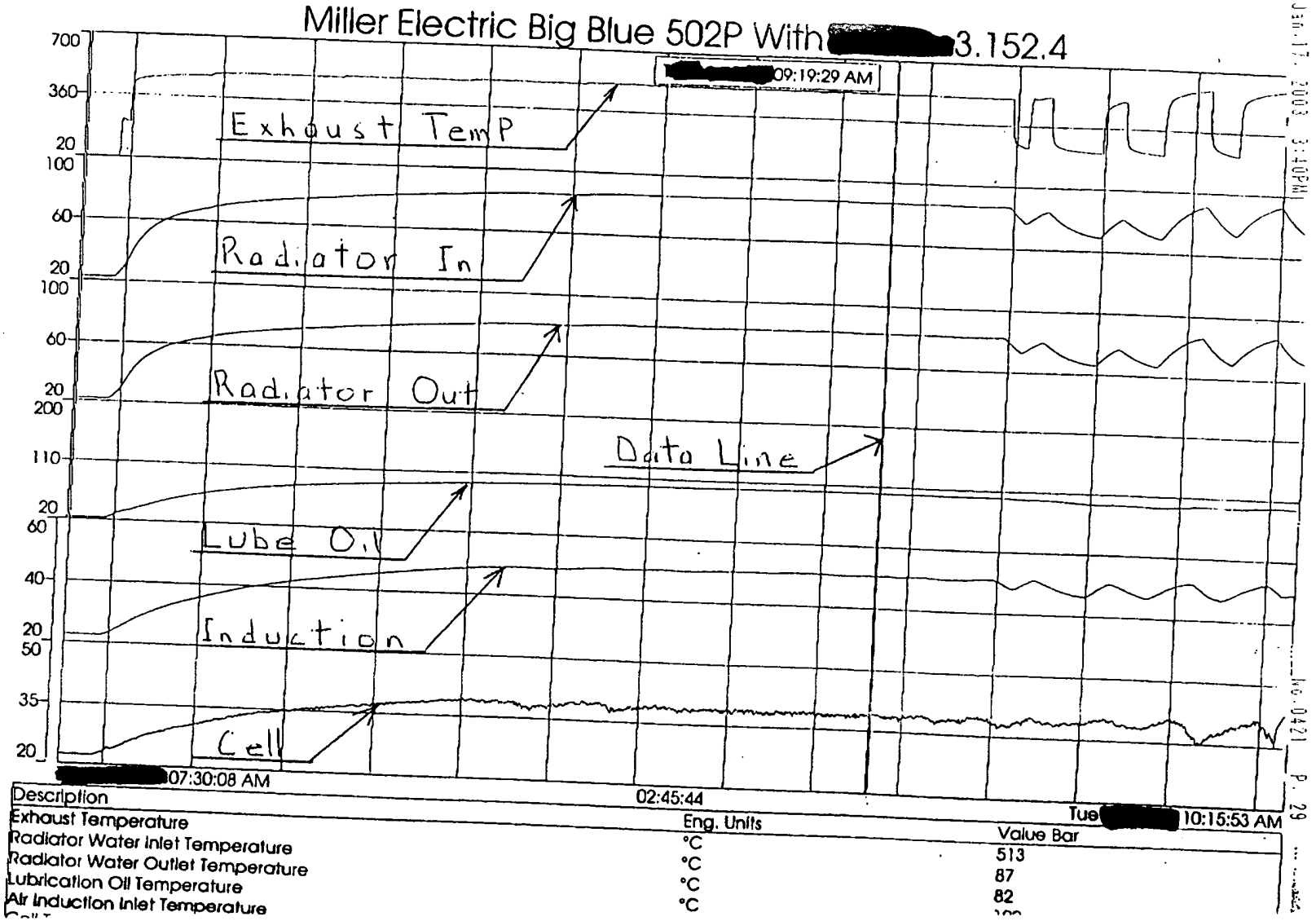
Cooling System Pressure: 7 Psi Cap | Radiator: Modine # PR31800D

Comments: During life test, with the open breather in front of the fan causing the radiator to become clogged with oil residue it was noted that even with 90 % blockage the engine did not overheat. This would suggest a robust cooling System. Steps are being taken to eliminate the oil residue on the radiator fins by placing the oil breather tube in Front of the radiator.

Probe Positions			
1Exhaust	2 Radiator Water Inlet	3 Radiator Water Outlet	4 Lubrication Oil
5 Induction Inlet	6	7	8
9	10	11	12

Time (Mins)	Amb (°C)	Probe Position - Temperature °C											
		1	2	3	4	5	6	7	8	9	10	11	12
			See	Chart	Next	Page							

Ambient Clearance Temperatures	Water (°C)	Lubricating Oil (°C)
Stabilised (or Peak) Temperature	87	100
Ambient Temperature	39	39
Rise Over Ambient (ROA)	48	61
Maximum Allowable Temperature (MAT)	103	125
Ambient Clearance (MAT ROA)	55	64


Miller Electric Big Blue 502P With [redacted] 3.152.4
[redacted] 09:19:29 AM
Exhaust Temp
Radiator In
Radiator Out
Data Line
Lube Oil
Induction
Cell
700
360
20
100
60
20
100
60
20
200
110
20
60
40
20
50
35
20
[redacted] 07:30:08 AM
02:45:44
Tue [redacted] 10:15:53 AM
Description
Exhaust Temperature
Radiator Water Inlet Temperature
Radiator Water Outlet Temperature
Lubrication Oil Temperature
Air Induction Inlet Temperature
Eng. Units
°C
°C
°C
°C
Value Bar
513
87
82